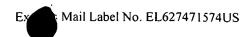


What is claimed is:

- 1 1. A parser program to parse mathematical optimization problems, wherein a geometric
- 2 program is converted from a set of algebraic expressions to a compact numeric format that can
- 3 be accepted by a computer-based geometric program solver.
- 1 2. The parser of claim 1, wherein said geometric program is comprised of an objective and a
- 2 set of one or more constraints.
- 1 3. The parser in claim 2, wherein:
- 2 said objective includes an expression of one or more mathematical terms; and
- ach constraint in said set includes either an inequality or equality of one or more
- 4 mathematical terms.
- 1 4. The parser in claim 3, wherein:
- 2 each mathematical term includes one or more optimization variables.
- 1 5. A computer-implemented method of parsing a mathematical optimization problem
- 2 comprising:
- reading a plurality of algebraic expressions that represent a mathematical optimization
- 4 problem, each algebraic expression in said plurality having one or more mathematical terms;
- 5 creating a set of signomial expressions by converting each of said mathematical terms to
- 6 a signomial; and



- 7 converting said set of signomial expressions to a compact numeric format to be accepted
- 8 by a computer-based geometric program solver.
- 1 6. The method of Claim 5, wherein said algebraic expressions include an objective and a set
- 2 of one or more constraints.
- 1 7. The method in claim 6, wherein:
- 2 said objective includes an expression of one or more mathematical terms; and
- ach constraint in said set includes either an inequality or equality of one or more
- 4 mathematical terms.
 - 8. The method in claim 7, wherein:
- each mathematical term includes one or more optimization variables.
- 1 9. The method of Claim 5, further comprising:
- 2 prior to said converting, determining that all signomial expressions in said set reduce to
- 3 either a posynomial objective, a posynomial inequality or a monomial inequality;
- 4 after said determining, identifying that said mathematical optimization problem is a
- 5 geometric program.
- 1 10. The method of Claim 5, further comprising:
- 2 prior to said converting, determining that at least one of said signomial expressions in
- 3 said set cannot be reduced to either a posynomial objective, a posynomial inequality or a
- 4 monomial inequality;

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after said determining, reporting to a user which of said signomial expressions in said set

cannot be reduced to either a posynomial objective, a posynomial inequality or a monomial

inequality.

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- 1 11. The method of Claim 10, further comprising the step of:
- simplifying each signomial expression in said set by mathematically canceling a
 combination of a plurality of said signomials.
 - 12. A computer-implemented method of parsing a mathematical optimization problem comprising:
 - reading a plurality of algebraic expressions that represent a mathematical optimization problem, each algebraic expression in said plurality having one or more mathematical terms; identifying that said algebraic expressions form a geometric program; and converting said plurality of algebraic expressions to a compact numeric format to be accepted by a computer-aided geometric program solver.
- 1 13. The method of Claim 12, wherein said algebraic expressions include an objective and a set of one or more constraints.
 - 14. The method in claim 13 wherein:
- said objective includes an expression of one or more mathematical terms; and
 each constraint in said set includes either an inequality or equality of one or more
- 4 mathematical terms.

- 1 15. The method in claim 14, wherein:
- 2 each mathematical term includes one or more optimization variables.
- 1 16. The method of claim 12, further comprising:
- 2 prior to said identifying, creating a set of signomial expressions by converting each of
- 3 said mathematical terms to a signomial; and
- 4 after said creating, determining that all signomial expressions in said set reduce to either
- 5 a posynomial objective, a posynomial inequality or a monomial inequality.
- 1 17. The method of Claim 16, further comprising:
- 2 prior to said identifying, determining for each algebraic expression in said plurality that a
- 3 mathematical combination of said mathematical terms form either a posynomial objective, a
- 4 posynomial inequality or a monomial inequality.
- 1 18. A computer-readable medium for parsing a geometric program comprising:
- a user interface to accept a plurality of algebraic expressions that represent a
- 3 mathematical optimization problem, each algebraic expression in said plurality having one or
- 4 more mathematical terms;
- 5 an expression verifier coupled to said user interface to identify that said algebraic
- 6 expressions form a geometric program; and
- 7 a matrix generator coupled to said to expression verifier to convert said plurality of
- 8 algebraic expressions to a compact numeric format to be accepted by a computer-aided
- 9 geometric program solver.

- 1 19. The computer-readable medium of Claim 18, wherein said algebraic expressions include 2 an objective and a set of one or more constraints.
- 1 20. The computer-readable medium in claim 19, wherein:
- 2 said objective includes an expression of one or more mathematical terms; and
- ach constraint in said set includes either an inequality or equality of one or more
- 4 mathematical terms.
 - 21. The computer-readable medium in claim 20, wherein:
 each mathematical term includes one or more optimization variables.
 - 22. The computer-readable medium of Claim 18, further comprising:

 an expression reducer to simplify each algebraic expression of said plurality by

 mathematically canceling a combination of a plurality of said mathematical terms.